

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
KIM Sun-young
10th Floor, Korea Coal Center
80-6, Susong-Dong, Chongro-Ku
110-727 Seoul
Republic of Korea

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing
(day/month/year) 14 May 2001 (14.05.01)

Applicant's or agent's file reference
OF01P002

IMPORTANT NOTIFICATION

International application No.
PCT/ KR 01/00246

International filing date (day/month/year)
19 February 2001 (19.02.01)

Applicant
POSDATA COMPANY LTD.

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statements under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.
3. ☐ With regard to the protest against payment of (an) initial fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the text of both the protest decision thereon to the designated Offices
 - ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis. 1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 month from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the IPEA/AT
Austrian Patent Office
Kohlmarkt 8-10
A-1014 Vienna
Facsimile No. 1/53424/200

Authorized officer

Wolf

Telephone No. +43 / 1 / 53424 - 450

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see the *PCT Applicant's Guide*, Volume II.

COPY FOR IB

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 21 OCT 2002

PCT

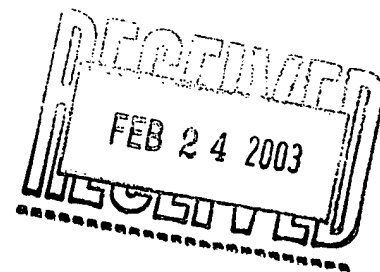
Applicant's or agent's file reference OF01P002	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR01/00246	International filing date(day/month/year) 19 FEBRUARY 2001 (19.02.2001)	Priority date (day/month/year) 09 JUNE 2000 (09.06.2000)
International Patent Classification (IPC) or national classification and IPC IPC7 H04N 5/45, H04N 5/91		
Applicant POSDATA COMPANY LTD. et al		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

- This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application



Date of submission of the demand 09 JANUARY 2002 (09.01.2002)	Date of completion of this report 28 SEPTEMBER 2002 (28.09.2002)
Name and mailing address of the IPEA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701,	Authorized officer KIM. Ki Young

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/KR01/00246

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1-8, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statment) under Article 19
 pages _____, filed with the demand
 pages 9, 10, 11, filed with the letter of 19/09/2002
- ☒ the drawings:
 pages 1/4-4/4, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

- These elements were available or furnished to this Authority in the following language _____ which is
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheet NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed." and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be

INTERNATIONAL PRELIMINARY EXAMINATION

International application No.

PCT/KR01/00246

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-9	YES
	Claims	NO
Inventive step (IS)	Claims 1-9	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-9	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

Claims 1-9 meet the criteria set out in PCT Article 33(2)-(3), because prior art (JP1996-205030, EP1999-0955609) does not teach or fairly suggest that the Method and devices for compression and multi-screen process of digital video signals by multi thread scaling. The method comprises: (a) a step to scale the resolutions of digital video signals; and (b) a step to compress or process for multi-screens the scaled digital video signals. the device comprises: multi-channel analog/digital converters; a compression FIFO; a multi-screen FIFO; a CPU which initializes each channel's analog/digital converter; and a video processor which transmits to the video memory. The processor for compression/multi-screen process may conduct the compression and multi-screen process sequentially from the compression FIFO and the multi-screen FIFO depending on the even/odd fields of the signals.

Therefore the invention according to claims 1-9 is considered to be new, to involve an inventive step and to be industrially applicable.

WHAT IS CLAIMED IS:

1. The method to compress and process for multi-screens digital video signals by multi-thread scaling, which uses a single integrated analog/digital converter for each channel for compression/multi-screen process, comprising:
 - (a) a step to scale the resolutions of digital video signals outputted from analog/digital converters for compression or for multi-screen process depending on the even/odd fields of the inputted video signals; and
 - (b) a step to compress or process for multi-screens the scaled digital video signals according to the resolutions scaled depending on the even/odd fields in the said step (a).
2. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 1, wherein, at the said step (a), the video signals are scaled to have a resolution for compression in the even field.
3. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 2, wherein the resolution for compression is 352x240.
4. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 1, wherein, at the said step (a), the video signals are scaled to have the resolutions for multi-screen process in the odd field.
5. The method for digital video signal compression/multi-screen process by multi-

analog/digital converter so that the converted digital video signals may be scaled into various resolutions depending on the even/odd fields of the inputted multi-screen video signals; and

a video processor which transmits to the video memory the video signals which have been inputted to the said multi-screen FIFO according to the rules pre-determined for the multi-screen process.

8. The device for compression and multi-screen process of digital video signals by multi-thread scaling according to claim 7, wherein the analog/digital converters:

generate even field/odd field indicators, after being initialized by the said CPU;

store the digital video signals scaled to have the resolution of 352x240 in the compression FIFO, if the field is even; and

store the digital video signals scaled to have the resolutions of 180x120 for 16 screens, 240x160 for 9 screens or 360x240 for 4 screens in the multi-screen FIFO, if the field is odd.

9. The device for compression and multi-screen process of digital video signals by multi-thread scaling according to claim 7, wherein:

the said CPU is programmed to control the operation registers of the analog/digital converters so that the video signals may be scaled to have the resolutions of 180x120 for 16 screens, 240x160 for 9 screens, or 360x240 for 4 screens in the event that the field indicator is odd.

thread scaling according to claim 4, wherein the multi-screen process is the process for 4 screens, 9 screens or for 16 screens.

6. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 5, wherein:

the resolution for 4 screens is 360x240;

the resolution for 9 screens is 240x160; and

the resolution for 16 screens is 180x120.

7. The device for compression and multi-screen process of digital video signals by multi-thread scaling comprising;

multi-channel analog/digital converters, which generate even/odd field indicators depending on the fields of the inputted multi-channel video signals and scale the resolution of each channel's video signals for compression or for multi-screen process while converting each channel's video signals into digital signals according to the even/odd fields;

a compression FIFO which stores, for compression, the video signals outputted from each channel's analog/digital converter based upon the even/odd field indicator of the said analog/digital converter;

a multi-screen FIFO which stores, for multi-screen process, the video signals outputted from each channel's analog/digital converter based upon the even/odd field indicator of the said analog/digital converter;

a CPU which initializes each channel's analog/digital converter, the compression FIFO and the multi-screen FIFO, and controls each channel's

PCT REQUEST

OF01P002

Original (for SUBMISSION) - printed on 19.02.2001 02:52:47 PM

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.91 (updated 01.01.2001)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Korean Industrial Property Office (RO/KR)
0-7	Applicant's or agent's file reference	OF01P002
I	Title of invention	METHODS AND DEVICES FOR DIGITAL VIDEO SIGNAL COMPRESSION AND MULTI-SCREEN PROCESS BY MULTI-THREAD SCALING
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	POSDATA COMPANY LTD.
II-5	Address:	276-2, Seohyun-dong, Pundang-gu 463-050 Seongnam-si, Kyonggi-do Republic of Korea
II-6	State of nationality	KR
II-7	State of residence	KR
II-8	Telephone No.	82-2-725-4774
II-9	Facsimile No.	82-2-722-0747
II-10	e-mail	syk@kc1law.com
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	JEONG, Cha-Gyun
III-1-5	Address:	248-2006, Ssangyong-Apartment, Hwangol-village, Youngtong-dong, Paldal-gu 442-741 Soowon-si, Kyonggi-do Republic of Korea
III-1-6	State of nationality	KR
III-1-7	State of residence	KR

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IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name (LAST, First)	KIM, Sun-young
IV-1-2	Address:	10th Floor, Korea Coal Center 80-6, Susong-Dong, Chongro-Ku 110-727 Seoul Republic of Korea
IV-1-3	Telephone No.	82-2-725-4774
IV-1-4	Facsimile No.	82-2-722-0747
IV-1-5	e-mail	syk@kcilaw.com
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW MZ SD SL SZ TZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH&LI CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

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V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.		
V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	09 June 2000 (09.06.2000)	
VI-1-2	Number	2000-31825	
VI-1-3	Country	KR	
VII-1	International Searching Authority Chosen	Austrian Patent Office (ISA/AT)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	8	-
VIII-3	Claims	3	-
VIII-4	Abstract	1	EZABST00.TXT
VIII-5	Drawings	4	-
VIII-7	TOTAL	20	
	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney	✓	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-18	Figure of the drawings which should accompany the abstract	2	
VIII-19	Language of filing of the international application	English	
IX-1	Signature of applicant or agent		
IX-1-1	Name (LAST, First)	KIM, Sun-young 	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	

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10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/AT
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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PCT (ANNEX - FEE CALCULATION SHEET)

OF01P002

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(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only		
0-1	International Application No.		
0-2	Date stamp of the receiving Office		
0-4	Form - PCT/RO/101 (Annex) PCT Fee Calculation Sheet		
0-4-1	Prepared using	PCT-EASY Version 2.91 (updated 01.01.2001)	
0-9	Applicant's or agent's file reference	OF01P002	
2	Applicant	POSDATA COMPANY LTD., et al.	
12	Calculation of prescribed fees	fee amount/multiplier	total amounts (KRW)
12-1	Transmittal fee T	⇒	45,000
12-2	Search fee S	⇒	159,500
12-3	International fee		
	Basic fee (first 30 sheets) b1	425,800	
12-4	Remaining sheets	0	
12-5	Additional amount (X)	9,800	
12-6	Total additional amount b2	0	
12-7	b1 + b2 = B	425,800	
12-8	Designation fees		
	Number of designations contained in international application	86	
12-9	Number of designation fees payable (maximum 6)	6	
12-10	Amount of designation fee (X)	91,700	
12-11	Total designation fees D	550,200	
12-12	PCT-EASY fee reduction R	-131,000	
12-13	Total International fee (B+D-R) I	⇒	845,000
12-17	TOTAL FEES PAYABLE (T+S+I+P)	⇒	1,049,500
12-19	Mode of payment	cash	

VALIDATION LOG AND REMARKS

13-2-1	Validation messages Request	Green? The title of the invention shall be short and precise. Please verify.
13-2-2	Validation messages States	Green? More designations could be made. The following States have not been designated: KR. Please verify.

PCT (ANNEX - FEE CALCULATION SHEET)

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13-2-6	Validation messages Contents	Green? Priority 1. The priority document is not enclosed. (The applicant must furnish it within 16 months from the earliest priority date claimed)
13-2-1 0	Validation messages For receiving Office/International Bureau use only	Green? Verify electronic data for consistency against printed form.

The demand must be filed directly with the competent International Preliminary examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ KR

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States(except where otherwise indicates).

For International Preliminary Examining Authority use only			
Identification of IPEA		Date of receipt of DEMAND	
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference OF01P002	
International application No. PCT/KR01/00246	International filing date(day/month/year) 19 February 2001 (19.02.2001)	(earliest)Priority date(day/month/year) 09 June 2000 (09.06.2000)	
Title of invention METHODS AND DEVICES FOR DIGITAL VIDEO SIGNAL COMPRESSION AND MULTI-SCREEN PROCESS BY MULTI-THREAD SCALING			
Box No. II APPLICANT(S)			
Name and address:(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) POSDATA COMPANY LTD. 276-2, Seohyun-dong, Pundang-gu 463-050 Seongnam-si, Kyonggi-do Republic of Korea		Telephone No.: 82-2-725-4774	
		Facsimile No.: 82-2-722-0747	
		Teleprinter No.:	
		Applicant's registration No. with the Office 1-1998-004071-3	
State(that is, country)of nationality: KR		State(that is, country)of residence: KR	
Name and address:(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) JEONG, Cha-Gyun 248-2006, Ssangyong-Apartment, Hwangol-village, Youngtong-dong, Paldal-gu 442-741 Soowon-si, Kyonggi-do Republic of Korea			
State(that is, country)of nationality: KR		State(that is, country)of residence: KR	
Name and address:(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)			
State(that is, country)of nationality:		State(that is, country)of residence:	
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.			

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: (Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)KIM, Sun-young
10th Floor, Korea Coal Center
80-6, Susong-Dong, Chongro-Ku,
110-727 Seoul
Republic of Korea

Telephone No.: 82-2-725-4774

Facsimile No.: 82-2-722-0747

Teleprinter No.:

Agent's registration No. with the Office
9-1998-000131-1☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☐ as originally filed
☐ as amended under Article 34the claims ☐ as originally filed
☐ as amended under Article 19(together with any accompanying statement)
☐ as amended under Article 34the drawings ☐ as originally filed
☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International preliminary examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments(Rule 69.1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.)

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International preliminary examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of a translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States(that is, all States which have been designated and which are bound by Chapter II of the PCT)

Excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|---|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy(or, where required, translation)of amendment under Article 19 | : | sheets |
| 4. copy(or, where required, translation)of Statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other(specify) | : | sheets |

For International Preliminary
Examining Authority use only

received Not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

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| 1. <input checked="" type="checkbox"/> fee calculation sheet | 5. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input checked="" type="checkbox"/> original separate power of attorney | 6. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
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Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

KIM, Sun-young



1. Date of actual receipt of DEMAND For International Preliminary Examining Authority use only

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b)

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to rule 82

Demand received from IPEA on For International Bureau use only

PCT

FEE CALCULATION SHEET

Annex to the Demand

International application No. PCT/KR01/00246	For International Preliminary Examining Authority use only
Applicant's or agent's file reference OF01P002	Date stamp of the IPEA
Applicant <div style="text-align: center; font-size: 1.2em;">POSDATA COMPANY LTD.</div>	
Calculation of prescribed fees	
1. Preliminary examination fee	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">KRW150,000</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">P</div>
2. Handling fee (<i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i>)	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">KRW 190,000</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">H</div>
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px; margin-bottom: 5px;">KRW 340,000</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">TOTAL</div>
Mode of Payment	
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input checked="" type="checkbox"/> cash
<input type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons
<input type="checkbox"/> bank draft	<input type="checkbox"/> others(specify):
AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT <i>(This mode of payment may not be available at all IPEAs)</i>	
<input type="checkbox"/> Authorization to charge the total fees indicated above.	IPEA/ _____ Deposit Account No.: _____
<input type="checkbox"/> <i>(This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.)</i>	Date: _____ Name: _____
	Signature: _____

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NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

KIM, Sun-young
10th Floor, Korea Coal Center
80-6, Susong-Dong
Chongro-Ku
Seoul 110-727
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 13 December 2001 (13.12.01)		
Applicant's or agent's file reference OF01P002		IMPORTANT NOTICE
International application No. PCT/KR01/00246	International filing date (day/month/year) 19 February 2001 (19.02.01)	
Applicant POSDATA COMPANY LTD. et al		Priority date (day/month/year) 09 June 2000 (09.06.00)

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:
KP,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:
AE,AG,AL,AM,AP,AT,AU,AZ,BA,BB,BG,BR,BY,BZ,CA,CH,CN,CR,CU,CZ,DE,DK,DM,DZ,EA,EE,EP,
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MK,MN,MW,MX,MZ,NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on
13 December 2001 (13.12.01) under No. WO 01/95618

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and the PCT Applicant's Guide, Volume II.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.91.11

(19) World Intellectual Property Organization
International Bureau



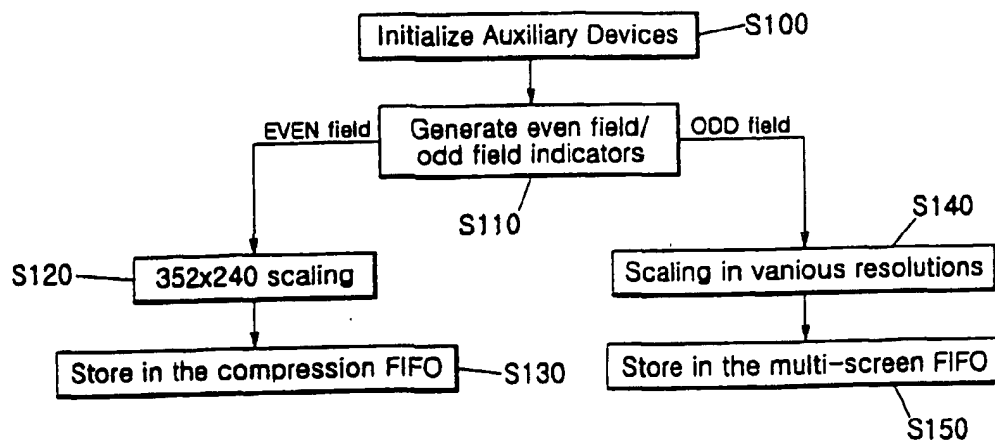
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- (71) Applicant (*for all designated States except US*):
POSDATA COMPANY LTD. [KR/KR]; 276-2, Seohyun-dong, Pundang-gu, Kyonggi-do, Seongnam-si 463-050 (KR).
- (72) Inventor; and
(75) Inventor/Applicant (*for US only*): **JEONG, Cha-Gyun [KR/KR]; 248-2006, Ssangyong-Apartment, Hwangol-village, Youngtong-dong, Paldal-gu, Kyonggi-do, Soowon-si 442-741 (KR).**
- (74) Agent: **KIM, Sun-young; 10th Floor, Korea Coal Center, 80-6, Susong-Dong, Chongro-Ku, Seoul 110-727 (KR).**
- (81) Designated States (*national*): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.**
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- Published:
— *with international search report*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **METHODS AND DEVICES FOR DIGITAL VIDEO SIGNAL COMPRESSION AND MULTI-SCREEN PROCESS BY MULTI-THREAD SCALING**



(57) Abstract: The present invention relates to methods and devices for compression and multi-screen process of digital video signals by multi-thread scaling. The method comprises: (a) a step to scale the resolutions of digital video signals; and (b) a step to compress or process for multi-screens the scaled digital video signals. The device comprises: multi-channel analog/digital converters; a compression FIFO; a multi-screen FIFO; a CPU which initializes each channel's analog/digital converter; and a video processor which transmits to the video memory. The processor for compression/multi-screen process may conduct the compression and multi-screen process sequentially from the compression FIFO and the multi-screen FIFO depending on the even/odd fields of the signals. Thus, the method and device uses *N* analog/digital converters for the same *N* channels while providing the same function as the conventional system.

Methods and Devices for Digital Video Signal Compression and Multi-Screen Process by Multi-Thread Scaling

TECHNICAL FIELD

5 The present invention relates to the method and device for digital video signal compression/multi-screen process by multi-thread scaling.

BACKGROUND ART

 Compression/multi-screen process of digital video signals may be used in a
10 digital video recorder (DVR) which converts analog images into digital images and records/stores such images, or displays such images real time.

 Ordinarily, a DVR must compress and record multi-channel video signals inputted from a number of cameras, and must display such signals on multi-screens.

 Among various modules constituting such DVR system, the compression unit
15 and the multi-screen processor are the most important modules. In the conventional multi-channel DVR systems, such compression units and multi-screen processors are set apart as independent modules.

 The multi-thread scaling means to process screens of different resolutions alternating the even field and the odd field of interlacing.

20 Figure 1 is a diagram illustrating a conventional DVR system with an independent compression unit and an independent multi-screen processor.

 Operations of the compression unit (10) illustrated in Figure1 are explained herein below. First of all, the central processing unit ("CPU") (13) initializes the analog/digital converters (11), and the compression FIFO (12) in the pre-determined

order. Such initialized analog/digital converters (11) store digital data in the compression FIFO (12) and issues to the CPU (13) an interrupt exception handling request. Although the CPU (13) may fetch video data after polling the analog/digital converters (11), the compression FIFO (12) is used in order to decrease the load on the CPU (13), to increase the video data transmission efficiency, and to reduce transmission errors. The CPU (13)'s exception handling routine transmits video data from the compression FIFO (12) to the memory (RAM) (30) by a direct memory access method, encodes such data using compression algorithms such as MPEG, JPEG, and H.26x, etc., and then stores the data in a storage such as a hard disk.

10 The multi-screen processor (20) as illustrated in Figure 1 operates as follows. In the multi-screen processor, the video processor (23) transmits digitalized video data from the multi-screen FIFO (22) to the video memory (31) according to the pre-determined rules set for the multi-screen processing. Then, such data are processed to constitute multi-screens, such as 4/8/16 screens, on a TV or a VGA monitor.

15 As explained above, the conventional system has dependent modules for the compression unit (10) and the multi-screen processor (20) because the compression unit (10) and the multi-screen processor (20) are programmed to process video data in different resolutions. In other words, the compression unit (10) may process video data real time only if it is programmed to be a 30 frame transmission mode at the resolution of 352x240. Also, the multi-screen processor (20) for 16 screens, for example, may process video data real time only if it is programmed to be a 30 frame transmission mode at the resolution of 180x120. Therefore, the conventional N-channel DVR with independent compression unit (10) and multi-screen processor (20) requires 2xN analog/digital converters.

However, ordinary analog/digital converters consume an extraordinary amount of the current and a great amount of electric power. Accordingly, they generate a significant amount of heat impairing stability of the system. Furthermore, conventional multi-channel DVR systems are expensive because (N channel)x2
5 analog/digital converters are required.

DISCLOSURE OF THE INVENTION

The present invention has a purpose to, by using the multi-thread scaling to process screens of different resolutions alternately in the even field and the odd field of
10 interlacing, provide the method and device for digital video signal compression/multi-screen process only with N analog/digital converters, which method and device integrates the conventional compression unit and multi-screen processor requiring 2xN analog/digital converters.

In order to accomplish the above-mentioned purpose, the present invention's
15 method to compress and process for multi-screens digital video signals by multi-thread scaling uses a single integrated analog/digital converter for each channel for compression/multi-screen process. The present invention's method comprises: (a) a step to scale the resolutions of digital video signals outputted from analog/digital converters depending on the even/odd fields of the inputted video signals; and (b) a
20 step to compress or process for multi-screens the scaled digital video signals according to the resolutions scaled in the said step (a). The present invention's device for compression and multi-screen process of digital video signals by multi-thread scaling comprises: multi-channel analog/digital converters, which generate even/odd field indicators depending on the fields of the inputted multi-channel video signals and scale

the resolution of each channel's video signals for compression or for multi-screen process while converting such signals into digital signals according to the even/odd fields of the signals; a compression FIFO which stores, for compression, the video signals outputted from each channel's analog/digital converter based upon the even/odd field indicator of such analog/digital converter; a multi-screen FIFO which stores, for multi-screen process, the video signals outputted from each channel's analog/digital converter based upon the even/odd field indicator of such analog/digital converter; a CPU which initializes each channel's analog/digital converter, the compression FIFO, and the multi-screen FIFO, and controls each channel's analog/digital converter so that the converted digital video signals may be scaled into various resolutions depending on the fields of the inputted multi-screen video signals; and a video processor which transmits to the video memory the video signals which were inputted to the said multi-screen FIFO according to the rules pre-determined for the multi-screen process.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will further be described by way of example and with reference to the following drawings, in which,

Figure 1 is a diagram illustrating a conventional DVR system with an independent compression unit and an independent multi-screen processor.

Figure 2 is a flow chart for the compression/multi-screen process method for N channel digital video signals using N analog/digital converters according to the present invention.

Figure 3 is a diagram illustrating, as a preferred embodiment of the present invention, the device for digital video signal compression/multi-screen process

integrating the compression unit and the multi-screen processor.

Figure 4 is a diagram illustrating the operation principle of the multi-thread scaling of the present invention's method and device.

Detailed explanations of a preferred embodiment of the method and device for
5 digital video signal compression/multi-screen process by multi-thread scaling are
provided in the following with reference to the attached drawings.

BEST MODE FOR CARRYING OUT THE INVENTION

Figure 2 is a flow chart for the compression/multi-screen process method for N
10 channel digital video signals using N analog/digital converters according to the present
invention.

The initialization of auxiliary devices (S100) is a step in which the CPU
initializes each channel's analog/digital converter, the compression FIFO, and the
multi-screen FIFO.

15 The generation of even field/odd field indicators (S110) is a step in which the
initialized analog/digital converter of each channel generates even field/odd field
indicators. Figure 4 illustrates such generated even field/odd field indicators
corresponding to time indicated on the time axis.

If the generated even field/odd field indicator is even, the 352x240 scaling
20 (S120) is a step in which outputs digitalized video signals scaled to 352x240, and the
said outputted digital video signals are transmitted to the compression FIFO (S130).

If the generated even field/odd field indicator is odd, digitalized video signals
scaled to 180x120 for 16 screens, to 240x160 for 9 screens, or to 360x240 for 4 screens,
are outputted (S140), and the outputted digital video signals are transmitted to the

multi-screen FIFO (S150). At the step S140, the CPU is programmed to control the operation register of each channel's analog/digital converter so that the video signals may be scaled to 180x120 for 16 screens, to 240x160 for 9 screens, or to 360x240 for 4 screens in the event that the field indicator is odd.

5 Figure 3 is a diagram illustrating, as a preferred embodiment of the present invention, the device for digital video signal compression/multi-screen process in an N-channel DVR system with N analog/digital converters.

As illustrated in Figure 3, the device has an integrated compression/multi-screen processor (40). In the following, compression of the inputted analog video signals in
10 the even field and multi-screen process, for 4/9/16 multi-screens, of the inputted signals in the odd field are explained.

N analog/digital converters (41), after being initialized by the CPU (44), generate even field/odd field indicators, digitalize each channel's video signals and scale them to the resolutions of 180x120 for 16 screens, 240x160 for 9 screens,
15 360x240 for 4 screens, or 352x240 for the normal screen. If the even field/odd field indicator is even, the digitalized video signals, which have been scaled to the resolution of 352x240, are stored in the compression FIFO (42). If the even field/odd field indicator is odd, the digitalized video signals, which have been scaled to the resolutions of 180x120 for 16 screens, 240x160 for 9 screens or 360x240 for 4 screens, are stored
20 in the multi-screen FIFO (43).

The compression FIFO (42) stores in it the video signals outputted from each channel's analog/digital converter (41) if the even field/odd field indicator is even. Although the CPU (44) may fetch digitalized video signals after polling the said analog/digital converter group (41), the present invention uses the compression FIFO

(42) in order to reduce the load on the CPU (44), to raise the transmission efficiency of video signals, and to reduce transmission errors.

The multi-screen FIFO(43) stores the scaled video signals outputted from each channel's analog/digital converter if the even field/odd field indicator is odd.

5 The CPU (44) initializes the analog/digital converter (41) of each channel, the compression FIFO and the multi-screen FIFO. Furthermore, the CPU (44) controls the said analog/digital converters (41) so that the digitalized video signals may be scaled to various resolutions according to the even field/odd field indicators generated at each channel's analog/digital converter. The CPU (44) is programmed to control
10 the operation register of each channel's analog/digital converter (41) so that the video signals may be scaled to the resolutions of 180x120 for 16 screens, 240x160 for 9 screens, or 360x240 for 4 screens in the event that the field indicator is odd.

The video processor (45) transmits to the video memory the video signals which have been inputted to the multi-screen FIFO in accordance with the rules pre-
15 determined for the multi-screen process.

Figure 4 is a diagram illustrating the operation principle of the multi-thread scaling of the present invention.

Figure 4 illustrates even field/odd field indicators generated by each channel's analog/digital converter corresponding to the time represented at the time axis. Based
20 upon such even field/odd field indicators, the CPU (44) controls the operation registers of the analog/digital converters (41) of each channel.

As explained in the foregoing, according to the present invention's method and device for digital video signal compression and multi-screen process by multi-thread scaling, the processor for compression/multi-screen process may conduct the

compression and multi-screen process sequentially from the compression FIFO and the multi-screen FIFO depending on the even/odd fields of the signals. Thus, compared with the conventional multi-channel DVR system which uses $2*N$ analog/digital converters for N channels, the present invention's method and device uses N analog/digital converters for the same N channels while providing the same function as the conventional system.

By implementing a system equivalent to the conventional system, which requires $2xN$ ADC, with only N analog/digital converters, the present invention saves the electricity and expense required for the conventional system by 100%. In addition to the effect of saving the electricity consumed for the system, the present invention also increases the stability of the multi-channel DVR system by reducing the number of required analog/digital converters.

WHAT IS CLAIMED IS:

1. The method to compress and process for multi-screens digital video signals by multi-thread scaling, which uses a single integrated analog/digital converter for each
5 channel for compression/multi-screen process, comprising:

(a) a step to scale the resolutions of digital video signals outputted from analog/digital converters depending on the even/odd fields of the inputted video signals; and

(b) a step to compress or process for multi-screens the scaled digital video
10 signals according to the resolutions scaled in the said step (a).

2. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 1, wherein:

at the said step (a), the video signals are scaled to have a resolution for
15 compression in the even field.

3. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 2, wherein:

the resolution for compression is 352x240.
20

4. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 1, wherein:

at the said step (a), the video signals are scaled to have the resolutions for multi-screen process in the odd field.

5. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 4, wherein:

the multi-screen process is the process for 4 screens, 9 screens or for 16 screens.

5

6. The method for digital video signal compression/multi-screen process by multi-thread scaling according to claim 5, wherein:

the resolution for 4 screens is 360x240;

the resolution for 9 screens is 240x160; and

10

the resolution for 16 screens is 180x120.

7. The device for compression and multi-screen process of digital video signals by multi-thread scaling comprising:

multi-channel analog/digital converters, which generate even/odd field
15 indicators depending on the fields of the inputted multi-channel video signals and scale the resolution of each channel's video signals for compression or for multi-screen process while converting each channel's video signals into digital signals according to the even/odd fields;

a compression FIFO which stores, for compression, the video signals outputted
20 from each channel's analog/digital converter based upon the even/odd field indicator of the said analog/digital converter;

a multi-screen FIFO which stores, for multi-screen process, the video signals outputted from each channel's analog/digital converter based upon the even/odd field indicator of the said analog/digital converter;

a CPU which initializes each channel's analog/digital converter, the compression FIFO and the multi-screen FIFO, and controls each channel's analog/digital converter so that the converted digital video signals may be scaled into various resolutions depending on the fields of the inputted multi-screen video signals;

5 and

a video processor which transmits to the video memory the video signals which have been inputted to the said multi-screen FIFO according to the rules pre-determined for the multi-screen process.

10 8. The device for compression and multi-screen process of digital video signals by multi-thread scaling according to claim 7, wherein the analog/digital converters:

generate even field/odd field indicators, after being initialized by the said CPU;

store the digital video signals scaled to have the resolution of 352x240 in the compression FIFO, if the field is even; and

15 store the digital video signals scaled to have the resolutions of 180x120 for 16 screens, 240x160 for 9 screens or 360x240 for 4 screens in the multi-screen FIFO, if the field is odd.

20 9. The device for compression and multi-screen process of digital video signals by multi-thread scaling according to claim 7, wherein:

the said CPU is programmed to control the operation registers of the analog/digital converters so that the video signals may be scaled to have the resolutions of 180x120 for 16 screens, 240x160 for 9 screens, or 360x240 for 4 screens in the event that the field indicator is odd.

Fig. 1

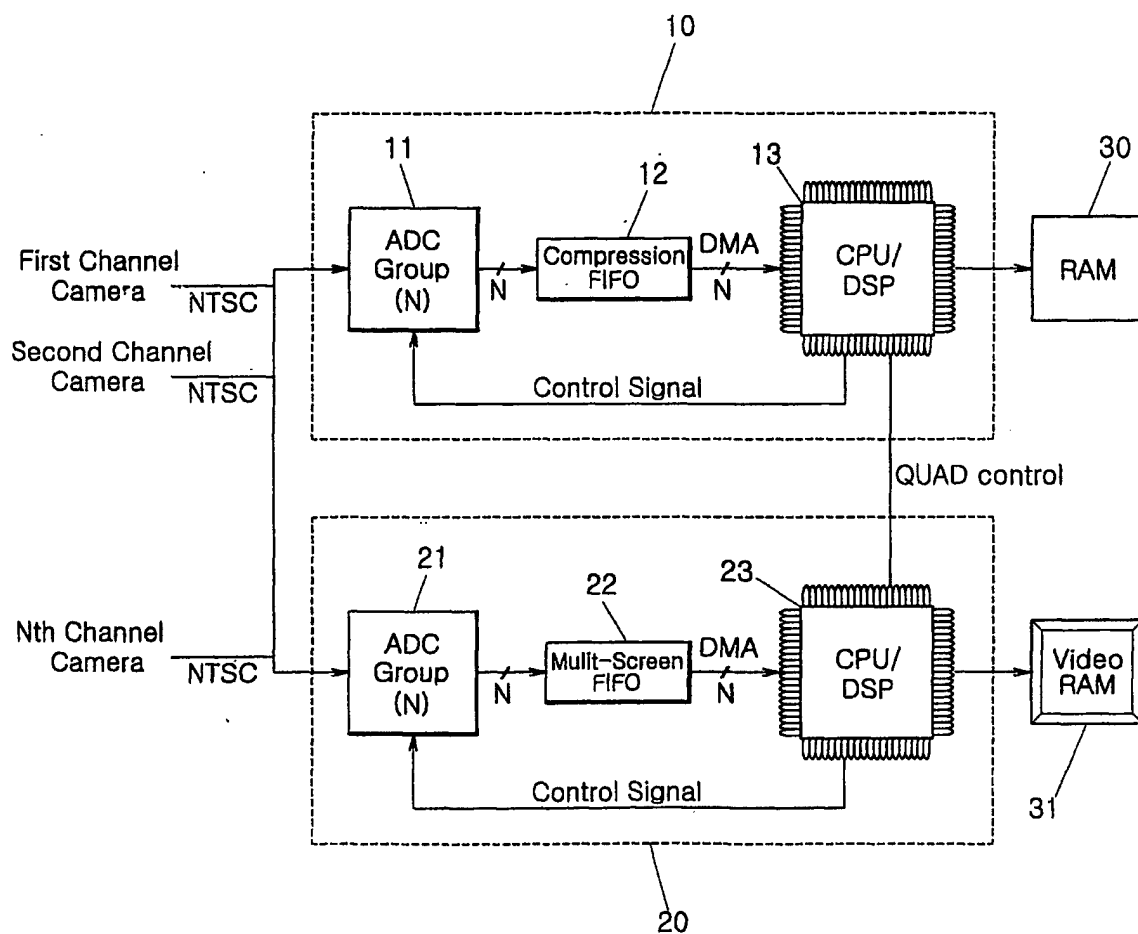


Fig. 2

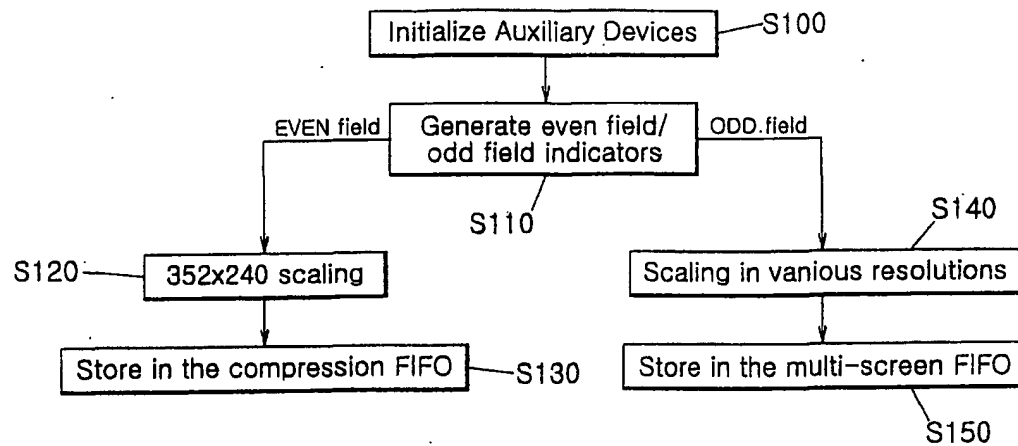
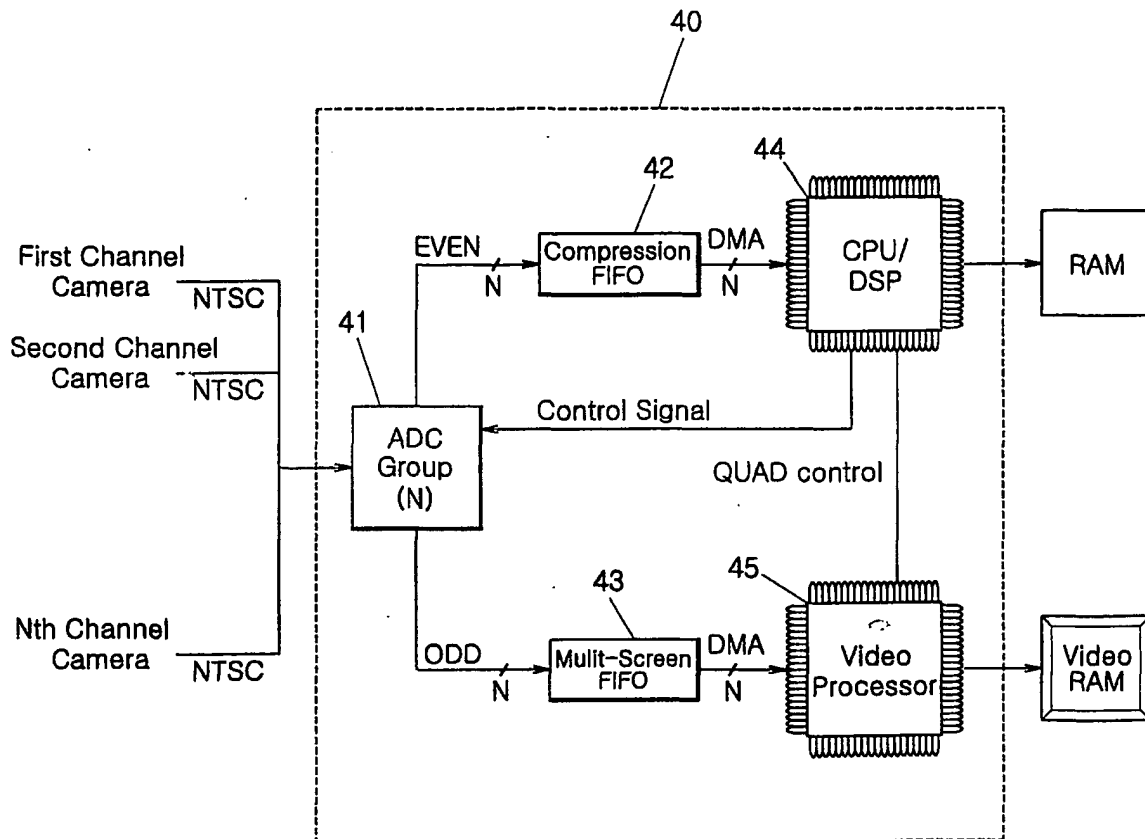
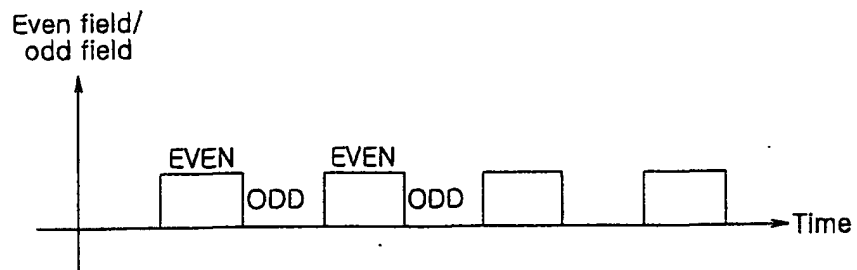


Fig. 3



$\frac{4}{4}$

Fig. 4



PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference OF01P002	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/KR 01/00246	International filing date (day/month/year) 19 February 2001 (19.02.2001)	(Earliest) Priority Date (day/month/year) 9 June 2000 (09.06.2000)
Applicant POSDATA COMPANY LTD.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.: 2

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 01/00246

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: H04N 5/45, 5/91

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: H04N 5/265, 5/45, 5/91, 7/30

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08 205030 A (FUJITSU GENERAL LTD) 9 August 1996 (09.08.96) abstract. [online] [retrieved on 2001-04-26]. Retrieved from: EPOQUE PAJ Database]	1,7
A	EP 0955609 A1 (MOTOROLA INC et al.) 10 November 1999 (10.11.99) claims 1-6,15,19. -----	1,2

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

„A“ document defining the general state of the art which is not considered to be of particular relevance

„E“ earlier application or patent but published on or after the international filing date

„L“ document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

„O“ document referring to an oral disclosure, use, exhibition or other means

„P“ document published prior to the international filing date but later than the priority date claimed

„T“ later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

„X“ document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

„Y“ document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

„&“ document member of the same patent family

Date of the actual completion of the international search

26 April 2001 (26.04.2001)

Date of mailing of the international search report

14 May 2001 (14.05.2001)

Name and mailing address of the ISA/AT

Austrian Patent Office

Kohlmarkt 8-10; A-1014 Vienna

Facsimile No. 1/53424/535

Authorized officer

FUSSY

Telephone No. 1/53424/328

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 01/00246

Patent document cited in search report			Publication date	Pat nt family memb r(s)			Publication date
EP	A1	955609	10-11-1999	BR	A	9910272	02-01-2001
				EP	A1	955608	10-11-1999
				EP	A2	955607	10-11-1999
				EP	A1	1076884	21-02-2001
				EP	A1	1076885	21-02-2001
				EP	A1	1078529	28-02-2001
				JP	A2	00032463	28-01-2000
				JP	A2	00050274	18-02-2000
				JP	A2	00059795	25-02-2000
				US	A	6125147	26-09-2000
				WO	A1	9957684	11-11-1999
				WO	A1	9957685	11-11-1999
				WO	A1	9957908	11-11-1999
JP	A2	8205030	09-08-1996	none			